0056046

DOE/RL-2000-05
Revision 1

Radioactive Air Emissions Notice of Construction for Deactivation Activities at the 324 Building

RECEIVED
JAN 02 2002
EDMC

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management
Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

Approved for public release; further dissemination unlimited

Radioactive Air Emissions Notice of Construction for Deactivation Activities at the 324 Building

Date Published
December 2001

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

Chris Willingham 12-14-01
Release Approval Date

Printed in the United States of America

CONTENTS

CONTENTS (cont)

FIGURES

TABLES

TERMS

ALARACT	as low as reasonably achievable control technology
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
BARCT	best available radionuclide control technology
CFR	Code of Federal Regulations
CHA	cask handling area
Ci	curie
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
EDL	Engineering Development Laboratory
EPA	U.S. Environmental Protection Agency
ESP	electrostatic precipitator
FFCA	Federal Facility Compliance Agreement
HBEL	High Bay Engineering Laboratory
HEPA	high-efficiency particulate air
HLV	high-level vault
LLV	low-level vault
LOS	loadout stall
MEI	maximally exposed individual
mrem	millirem
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOC	notice of construction
POG	process offgas
PTE	potential-to-emit
PTRAEU	Portable/Temporary Radioactive Air Emission Unit
PUREX	plutonium-uranium extraction
REC	Radiochemical Engineering Cells
SAR	safety analysis report
SEPA	*State Environmental Policy Act of 1971*
SMF	Shielded Materials Facility
SNF	spent nuclear fuel
TEDE	total effective dose equivalent
VV	vessel ventilation

TERMS (cont)

WAC	Washington Administrative Code
WDOH	Washington State Department of Health

METRIC CONVERSION CHART

Into metric units / Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	meters	3.28084	feet
yards	0.9144	meters	meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1990, Professional Publications, Inc., Belmont, California.

This page intentionally left blank.

NOTICE OF CONSTRUCTION HISTORY

This section provides a brief Notice of Construction (NOC) history for 324 Building cleanout and deactivation activities. This history is pertaining to the following two NOCs.

The 324 Building Radiochemical Engineering Cells (REC) B-Cell cleanout activities previously were addressed by the *Radioactive Air Pollutants Notice of Construction Application for Cleanout of the Waste Technology Engineering Laboratory's B-Cell, 324 Building, 300 Area, Hanford Site* (95-PCA-443), hereafter referred to as the B-Cell Cleanout NOC. The Washington State Department of Health (WDOH) approved the B-Cell Cleanout NOC on September 18, 1995 (AIR 95-903). The U.S. Environmental Protection Agency (EPA) approval was not required for the B-Cell Cleanout NOC, as later confirmed by a letter dated August 12, 1999 from EPA, Region 10 (EPA 1999).

Additional work beyond the scope of the B-Cell Cleanout NOC will be involved in the deactivation of the 324 Building REC and other areas of the 324 Building. This additional work scope was addressed in Revision 0 of this document hereafter referred to as the 324 Building Deactivation NOC. Revision 0 of the 324 Building Deactivation NOC was approved by WDOH on June 26, 2001 (AIR 01-608). Approval condition number 29 required that a modification to the 324 Building Deactivation NOC be submitted to WDOH by December 31, 2001 to include the activities remaining to be completed under the B-Cell Cleanout NOC. This revision satisfies that approval condition, consolidating the two NOCs. On approval of this Revision 1 of the 324 Building Deactivation NOC, the B-Cell Cleanout NOC becomes obsolete.

This page intentionally left blank.

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION FOR DEACTIVATION ACTIVITIES AT THE 324 BUILDING

This revision describes the deactivation work activities anticipated through fiscal year 2007 for the 324 Building and associated ancillary facilities. This revision incorporates the remaining B-Cell cleanout activities previously addressed in the B-Cell Cleanout NOC (AIR 95-903/95-PCA-443). This revised 324 Building Deactivation NOC addresses all 324 Building deactivation scope (including remaining B-Cell cleanout deactivation activities). This revised 324 Building Deactivation NOC was prepared to satisfy WDOH approval condition number 29 (AIR 01-608) for the 324 Building Deactivation NOC (Rev. 0). This approval condition required that a modification of this NOC be submitted to WDOH to include the activities remaining to be completed under the B-Cell NOC; the two NOCs effectively are consolidated.

The activities in the 324 Building have been completed for the research and development mission for characterization of nuclear reactor fuels and materials and process development and demonstration for treatment of radioactive waste materials. The 324 Building is scheduled for deactivation and stabilization activities through fiscal year 2007. This deactivation and stabilization process will reduce the radiological inventory level and place the building in a stabilized and secure configuration suitable for conducting long-term surveillance and maintenance and/or decommissioning and demolition.

The unabated total effective dose equivalent (TEDE) conservatively estimated to the public hypothetical maximally exposed individual (MEI) is 8.2 E+2 millirem (mrem) per year for this 324 Building deactivation NOC. The abated TEDE conservatively estimated to the MEI is 4.2 E-1 mrem per year.

The following text addresses the requirements of Appendix A of Washington Administrative Code (WAC) 246-247 (requirements 1 through 18), and of Title 40 Code of Federal Regulations (CFR) Part 61.07.

1.0 LOCATION

Name and address of the facility, and location (latitude and longitude) of the emission unit:

U.S. Department of Energy, Richland Operations Office (DOE-RL)
Hanford Site,
Richland, Washington

324 Building, 300 Area
Latitude: 46° 22' 7.8" N
Longitude: 119° 16' 28.3" W

Figure 1 shows the location of the 324 Building within the 300 Area. The exhaust stack is identified as emission point EP-324-01-S.

2.0 RESPONSIBLE MANAGER

Name, title, address and phone number of the responsible manager:

Mr. D. T. Evans, Director,
Facility Transition Division
U.S. Department of Energy, Richland Operations Office
P.O. Box 550
Richland, Washington 99352
509-373-9278

3.0 PROPOSED ACTIONS

Identify the type and proposed action for which this application is submitted.

The proposed action is considered a significant modification to an emission unit (EP-324-01-S).

3.1 ACTIVE NOTICES OF CONSTRUCTION FOR THE 324 BUILDING

Revision 0 of the 324 Building Deactivation NOC was approved by WDOH on June 26, 2001 (AIR 01-608) and by EPA, Region 10, on June 29, 2001 (EPA 2001). The scope of this 324 Building deactivation NOC revision requires both WDOH and EPA approval.

The initial NOC (95-PCA-443) for the cleanout of the 324 Building B-Cell was approved by WDOH on September 18, 1995 (AIR 95-903). The EPA, Region 10, approval was not required for the B-Cell Cleanout NOC (EPA 1999). The B-Cell Cleanout NOC (AIR 95-903/95-PCA-443) addressed an inventory in B-Cell of 1.5 E+6 curies of dispersible material (primarily cesium-137and strontium-90) and 1.5 E+6 curies of nondispersible material (primarily spent fuel assemblies and vitrified radioactive material).

The source material covered by this 324 Building deactivation NOC revision includes the source material that has not yet been dispositioned under the terms and conditions of the B-Cell Cleanout NOC. Section 10.0 of this NOC revision addresses the total source material inventory for the proposed activities.

3.2 SCOPE OF DEACTIVATION ACTIVITIES

The 324 Building, a laboratory facility constructed in the mid-1960s, is a nonreactor nuclear facility. The research and development mission activities for nuclear fuels characterization and waste technology research have been completed. The 324 Building is now in transition, scheduled for deactivation and stabilization through fiscal year 2007. The 324 Building contains office spaces, hot and cold development laboratories for radioactive and nonradioactive materials respectively, hot cells, vaults and tanks, galleries, pipeways, a truck lock, and a loadout station. Some of the activities performed in the building were nonradioactive process development, characterization of irradiated materials, and chemical and physical processing development and demonstration for treatment of radioactive materials.

This 324 Building deactivation NOC revision addresses deactivation and stabilization activities and includes the uncompleted activities described in the previous approved B-Cell Cleanout NOC. Completed activities will result in placing the entire building in a stabilized and secure configuration for long-term surveillance and maintenance and/or decommissioning and demolition. Stabilization involves solid waste removal and activities using various decontamination methods on radiologically contaminated areas within the 324 Building.

The 324 Building areas that will undergo deactivation include the following:

- REC activities
  - A-Cell
  - B-Cell
  - C-Cell
  - D-Cell
  - Airlock.
- B-Cell sample room
- High-level vault (HLV) and tanks
- Low-level vault (LLV) and tanks
- REC pipe trenches
- Cask handling area (CHA)
- Truck lock and loadout station
- Laboratories/rooms and associated piping/utilities
- Shielded Materials Facility (SMF)
  - East cell
  - South cell
  - Airlock cell.
- Engineering Development Laboratory (EDL) Room 101
- EDL-102
- EDL-145
- EDL-146
- EDL-147
- High Bay Engineering Laboratory (HBEL)
- Tank pit (in basement)
- Wastewater diverter tank.

Large items (equipment and waste materials) will be size-reduced and packaged for transport to compliant storage/disposal facilities as appropriate. The remaining loose material will be collected and packaged for storage/disposal. Various decontamination methods will be employed to reduce/remove contamination. As the decontamination work is completed, the associated ventilation ductwork will be remediated (decontamination, isolation, or removal). Once decontamination has been achieved to acceptable levels for the areas served by the high-efficiency particulate air (HEPA) filters and similar particulate emission control devices, those control devices will be removed and/or isolated. The ventilation system for the 324 Building stack (EP-324-01-S) will operate at a reduced flow, shutting down in stages over an extended period, culminating in eventual closure of the stack.

4.0 STATE ENVIRONMENTAL POLICY ACT

If the project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.

The proposed action is exempt categorically from the requirements of SEPA under WAC 197-11-845.

5.0 CHEMICAL AND PHYSICAL PROCESSES

Describe the chemical and physical processes upstream of the emission unit.

The chemical and physical processes associated with decontamination of the 324 Building and associated ancillary facilities will consist of the following.

- Large equipment will be size-reduced, as needed, using processes such as mechanical shearing, cutting torches, laser cutters, and/or physical sawing activities.

- Size-reduced items and loose material will be collected and packaged to meet acceptance criteria for transfer to other suitable storage and disposal facilities.

- Cleaning/collection processes might include various methods or combinations of mechanical cleaning methods, e.g., blast nozzle cleaning; ultra high-pressure water scarification; media blast cleaning (with either vacuum recovered recycled or one shot media, where blast air, media, and radiologically contaminated material are vacuum recovered to prevent dispersion); scabbling (aggressive surface removal of metal and concrete); grinding; and vacuuming.

- Liquid decontamination could be employed to reduce contamination levels. This process would consist of spraying radiologically contaminated surfaces with pressurized liquids and collecting the resultant solutions.

- Processing of decontamination solutions will be accomplished predominantly by evaporation (using evaporators and dryers, packaging the solids, adding stabilizers as needed to form a solid mass), with direct release of the water vapor to the REC ventilation system. The release of water vapor will be controlled to protect the HEPA filter media by maintaining relative humidity and temperature conditions such that the system will not experience moisture collection on the filters. Relative humidity and temperature conditions will be controlled by heating the air passing through the REC, by limiting the boiloff rate, by controlling wattage applied to the evaporator heater unit(s), and/or by distributing the moisture to a larger airflow. Similar methods could be employed for the SMF.

- Spent decontamination solutions that are not evaporated will be staged in suitably designed tanks, if staging is needed. Treated liquids (filters, ion exchange, etc.) might be staged in suitably designed and located tanks and transferred to other facilities on the Hanford Site by tanker truck through the loadout stall (LOS). Smaller volumes might be containerized (e.g., packaged in absorbents in drums or placed in drums or carboys). If tanker trucks are used, displaced air from the tanker trucks would be routed back to the LOS (that is tied into the Zone I exhaust system described in Section 6.1.2).

- After deactivation efforts have been completed for a particular area of the 324 Building, ventilation ductwork for that area will be decontaminated, removed, and/or isolated. After sufficient decontamination has been achieved upstream of the associated HEPA filter or emissions/abatement control devices, the control devices will be removed or isolated.

- Containment and portable exhausters will be used as needed for personnel protection in local ventilated spaces for shutting down the existing ventilation system and for ventilating radiologically contaminated areas (piping, ancillary buildings, etc.) outside of areas that are served by the ventilation system for the 324 Building stack (EP-324-01-S).

- Annual maintenance inspections of the 324 Building wastewater diverter tank and final disposition of rainwater infiltration (such as by using a tanker truck or pumping into drums) will be performed without use of containment or portable exhausters. The radiological contents of the wastewater diverter tank, described in Section 10.6, are so low (near drinking water standards) that there will be no measurable impacts.

A cut-away of the 324 Building, displaying the relative perspective of the HLV, LLV, and REC, is shown in Figure 2. Simplified floor plans of the 324 Building are shown in Figures 3, 4, 5, and 6. More detailed plans of the REC layout and the SMF layout are shown in Figures 7 and 8 respectively.

6.0 PROPOSED CONTROLS

Describe the existing and proposed abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate in cubic meters/second for the emission unit.

The existing EP-324-01-S ventilation system will be used until the system is shut down. Final stage HEPA filters are tested annually at a minimum control efficiency of 99.95 percent. Currently, the annual average flow for the 324 Building stack (EP-324-01-S) is 30 cubic meters per second. The stack flow will be reduced in stages as decontamination projects are completed.

The existing EP-324-01-S ventilation system abatement equipment includes the A-frame filters for the REC (Figure 9) and the in-cell filters and ESPs located in B-Cell. This pollution control equipment is required for B-Cell cleanout activities. Before removal of the in-cell filters and electrostatic precipitators (ESPs) located in B-Cell, WDOH will be notified.

6.1 EP-324-01-S VENTILATION SYSTEM

The 324 Building ventilation system is divided into four zones (Zones I, II, III, and IV) using different zone pressure levels to maintain proper airflow direction (Section 6.1.2 provides a functional description). The system has interlocks, redundancy, failure-to-open control dampers, and backflow prevention dampers to maintain desired zone pressure and airflow control in the event of equipment failure (e.g., a broken mechanical linkage) or power failure. Confinement of radioactive contamination to Zone 1, the most highly contaminated zone, is provided by directional control of airflow from higher to lower pressure zones. All potentially radioactively contaminated airflow passes through at least one stage of HEPA filtration before exiting the building through a monitored and sampled stack. Air that does not have a potential for radioactive contamination either is drawn as supply air into Zones I or II or is exhausted (Zone III, filtered or Zone IV, unfiltered) out through roof vents.

The following provides descriptions of the air supply, exhaust, process offgas (POG), and vessel ventilation (VV) systems for the 324 Building.

6.1.1 Supply Air Systems

Supply air to almost all of Zones I and II (Figure 9) of the 324 Building is provided by the process air supply system that consists of two fan units (with no standby) using 100% outside air. Some outside air enters when doors are opened (e.g., truck lock). Some areas (e.g., Rooms 3C and 3D) also have theirown supply units, with varying amounts of recirculation.

Both REC and SMF hot cells (that are part of Zone I) receive supply air from adjoining areas. The REC draw air primarily through HEPA filters, but a minor amount of air is supplied unfiltered from surrounding work areas through cell wall penetrations. The SMF cells receive unfiltered air from the adjoining gallery.

6.1.2 Exhaust

During normal operation, the exhaust system leading to the 324 Building stack (EP-324-01-S) provides the only effluent path for in-building releases (Figure 9). The exhaust system is divided into Zones I, II, III, and IV, which are separated by different pressure levels to maintain flow from areas of low potential contamination to areas with higher potential contamination. Of these zones, Zone IV has the highest pressure and lowest potential contamination, and Zone I has the lowest pressure and the highest potential contamination.

Zone I exhaust serves high-level radioactive areas and includes filtration of the exhaust air through at least one testable stage of HEPA filtration before discharge to the environment. The Zone I exhaust system has three fans. Two exhaust fans normally operate, with one exhaust fan on standby, though occasionally all three exhaust fans could operate for brief periods during certain operations (e.g., airlock entries). The Zone I fans discharge to the atmosphere via the 46-meter-tall 324 Building stack (EP-324-01-S).

Zone II exhaust serves potentially contaminated areas in which low-level radioactive materials are handled and includes filtration of all air through at least one testable stage of HEPA filtration before discharge to the environment. The Zone II system has two operating fans and no standby fan. The Zone II fans discharge to the atmosphere via the 324 Building stack (EP-324-01-S).

Zone III exhaust serves normally noncontaminated areas and includes filtration of all air through one stage of high-efficiency filters (not tested as HEPA filters). Zone IV exhaust serves areas that do not contain any radioactive materials. The air from Zones III and IV either is exhausted outdoors through various powered roof exhausters or stacks, or is recirculated, depending on the location. The air from Zones III and IV does not contain radioactivity and monitoring is not required.

During failure of normal power, one Zone I exhaust fan and one Zone II exhaust fan operate on emergency backup power, while the supply fans and Zone II fans do not operate. However, even one Zone I exhaust fan is sufficient to maintain Zone I and Zone II negative pressure for contamination control and prevention of fugitive emissions. The stack sampling and monitoring systems also operate on emergency power during loss of normal power.

6.1.3 Process Offgas/Vessel Vent Systems and Basement Exhaust System

Two POG/VV systems are located in the 324 Building. The Zone I POG/VV system (Figure 10) serves the processes in the REC and the HLV and LLV tanks. The Zone II POG/VV system (Figure 11) serves processes in the EDL-101, EDL-102, HBEL, and the tank pit.

The Zone I POG/VV system serving the REC and the HLV and LLV has two common exhaust fans and at least one stage of testable HEPA filtration. The fans discharge into the Zone I exhaust system downstream of the final stage of Zone I HEPA filters. Both fans are connected to standby power. The fans are not required to operate under normal conditions, but can be operated as needed.

The Zone II POG/VV system serving the EDL-101, EDL-102, HBEL, and the tank pit has two exhaust fans (with no standby) that discharge through the Zone II exhaust tunnel upstream of the final stage of Zone II HEPA filters to the 324 Building stack (EP-324-01-S). Both fans are connected to normal power only. The fans are not required to operate under normal conditions, but can be operated as needed.

The basement exhaust system (Figure 9) has two parallel exhaust fans with high-efficiency filters that discharge through the Zone II exhaust tunnel upstream of the Zone II HEPA filters. The fans are not required to operate under normal conditions, but can be operated as needed.

6.2 HUMIDITY CONTROLS

To ensure that the particulate filters and HEPA filters are not affected adversely by moisture collection on the filters (from evaporation activities described in Section 5.0), it will be necessary to control relative humidity and temperature conditions such that the system will not experience moisture collection on the filters. Proposed controls are sufficient such that relative humidity and temperature conditions of the exhaust air will be controlled adequately, even during the difficult summer months of July and August. Relative humidity is controlled by heating the air passing through the cell, by limiting the boiloff rate, by controlling wattage applied to the evaporator heater unit(s), and/or by mixing the moisture into a larger airflow. Additional control and/or sensor equipment will be installed to ensure that humidity and temperature conditions are controlled/monitored as necessary such that moisture collection on the filters will not take place.

6.3 B-CELL CONTROLS

The control equipment for the B-Cell ventilation system includes the B-Cell ESPs, in-cell particulate filters, A-frame filters, and Zone I HEPA filters. When the ESPs and in-cell filters in B-Cell are removed from service, WDOH will be notified.

6.4 FUGITIVE EMISSIONS

Containment and portable exhausters will be used as necessary in areas not ventilated by the 324 Building stack (EP-324-01-S) ventilation system to control fugitive emissions. Portable exhausters will be used in accordance with the Portable/Temporary Radioactive Air Emission Units (PTRAEU) NOC (DOE/RL-96-75), whenever the exhausts are not directed to the 324 Building stack (EP-324-01-S). Annual maintenance inspections of the wastewater diverter tank and final disposition of the rainwater infiltration will be performed without the use of containment or portable exhausters.

7.0 DRAWINGS OF CONTROLS

Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.

Figures 9, 10, and 11 show the existing ventilation system for the 324 Building stack (EP-324-01-S), for Zones I and II, and for the two POG/VV systems described in Section 6.0.

8.0 RADIONUCLIDES OF CONCERN

Identify each radionuclide that could contribute greater than ten percent of the potential to emit TEDE to the MEI, or greater than 0.1 mrem/yr potential to emit TEDE to the MEI.

Radionuclides that could contribute greater than 10 percent of the potential-to-emit (PTE) TEDE to the MEI or greater than 0.1 mrem per year PTE TEDE to the MEI consist of cobalt-60, strontium-90, cesium-137, europium-154/155, plutonium-238, plutonium-239/240, and americium-241. For conservative PTE calculations, all activation products are considered to be cobalt-60, all fission products are considered to be cesium-137 and strontium-90 (in a 2:1 ratio, as described in Section 10.4), and all alpha radionuclides are considered to be americium-241.

9.0 MONITORING

Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential to emit TEDE to the MEI, or greater than 0.1 mrem/yr potential to emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with sufficient detail to demonstrate compliance with the applicable requirements.

An airborne particulate radionuclide sampling system compliant with National Emission Standards for Hazardous Air Pollutants (NESHAP) criteria was installed on the 324 Building stack (ESP-324-01-S) in late 1993. The system, which began operation in January 1994, is depicted in Figure 12.

The airborne particulate sampling system incorporates a six-nozzle, isokinetic sampling probe assembly positioned in the stack 8.6 equivalent diameters downstream of the stack entrance and 6.0 equivalent diameters upstream of the stack exit. Probe nozzles (nozzle inlet diameter = 0.293 inch) are located at the centers of equal annular areas according to requirements in American National Standards Institute (ANSI) N13.1 (1969).

A sample transport line extends from the probe assembly to the base of the stack where a sample collection filter is located (Figure 12). The transport line is made of stainless steel tubing and is heat traced, thermally insulated, and electrically grounded.

Stack particulate emission samples are withdrawn from the stack and through the sampling system by means of a dedicated vacuum system. The sampling rate is controlled using a control valve located downstream of the particulate sampling filter. The control valve is adjusted so that the velocity of air flowing through the sample probe assembly equals the average velocity of the stack gas at the sampling location. Sample flow in the sampling line (Figure 12) is measured by a flowmeter upstream of the control valve. Stack velocities are measured annually using EPA Methods 1 and 2 (40 CFR 60).

Currently, the sample collection filter is replaced monthly, though this frequency is subject to change should it be deemed necessary (e.g., pluggage of filter could shorten this period, as could removal to validate monitor alarms). The sample filter is stored for 7 days after removal from the sampler to permit decay of radon and thoron daughter radionuclides. The filter is analyzed for radioactivity. Each sample is screened individually for gross alpha and gross beta activity, and the samples collected over a 3-month period (calendar quarter) are combined and analyzed for specific radionuclides (cobalt-60, strontium-90, cesium-137, plutonium-238, plutonium-239/240, and americium-241). Minimum detection limits are established in HNF-EP-0835, "Statement of Work for Services provided by the Waste Sampling and Characterization Facility for the Environmental Compliance Program".

Stack sampling rotameters and pressure gauges are calibrated annually according to ANSI/NCSL Z540-1-1994 calibration by usage methodology.

Radiological surveys and smears will be used for periodic confirmatory measurements to verify low emissions for the use of portable exhausters in accordance with the PTRAEU NOC, for annual maintenance inspections of the 324 Building wastewater diverter tank, and for activities associated with final disposition of the wastewater diverter tank rainwater infiltration.

10.0 ANNUAL POSSESSION QUANTITY

Indicate the annual possession quantity for each radionuclide.

Table 1 summarizes the inventory of the 324 Building addressed by this deactivation NOC.

10.1 B-CELL CLEANOUT NOTICE OF CONSTRUCTION

The NOC for cleanout of B-Cell (AIR 95-903/95-PCA-443) was based on a conservatively estimated inventory of 1.5 E+6 Ci of radioactive dispersibles on the floor of B-Cell, consisting of 4.20 E+5 Ci of strontium-90 and 1.08 E+6 Ci of cesium-137 (HNF-2883). The NOC for cleanout of B-Cell also included a nondispersible radioactive inventory of 1.5 E+6 Ci. Most of the material included in this inventory has been transferred to the Plutonium-Uranium Extraction (PUREX) Storage Tunnel Number 2 and the Central Waste Complex. The inventory was described fully in HNF-2883. The remaining radionuclide inventory in the previously approved B-Cell Cleanout NOC is included in Table 1 (324 Building Deactivation Inventory) and is included in Sections 10.4 and 10.5.

10.2 HIGH-LEVEL VAULT AND LOW-LEVEL VAULT

Residual contamination remaining in the tank heels and seal pots of the HLV and LLV has been estimated at 1.4 E +4 Ci of cesium-137, with an additional estimated 7.0 E+3 Ci of strontium-90 present and 5.4 E+2 Ci of alpha based on the ratio described in Section 10.5. This inventory is included in Table 1.

10.3 SHIELDED MATERIAL FACILITY (SMF) INVENTORY

The SMF was estimated (HNF-2883) to have an inventory of 2.77 E+5 Ci of nondispersible irradiated material. This portion of the inventory consists of activation products in stainless steel, predominantly iron-55, iron-59, and nickel-63. However, to be conservative, the 2.77 E+5 Ci was assumed to be cobalt-60. In addition, an estimated 1.0 E+3 Ci of dispersible cesium-137 is present in the SMF. The SMF inventory is included in Table 1.

10.4 SPENT NUCLEAR FUEL

The inventory of spent nuclear fuel (SNF) in the REC is detailed in HNF-2883. The total SNF inventory is summarized as approximately 7.0 E+5 Ci of intact fuel rods and assemblies and 2.37 E+4 Ci of fuel fragments, pieces, and pins (HNF-5068). The estimate for total SNF in this NOC conservatively assumed that 2.5 percent of the SNF inventory was alpha (as americium-241), and the remaining fission products were considered cesium-137 and strontium-90 in a 2:1 ratio. The total inventory of SNF is included in Table 1, using the same ratios described in Section 10.5.

10.5 RADIOCHEMICAL ENGINEERING CELLS DECONTAMINATION

The water used for cleanout of the 5.0 E+4 Ci inventory (HNF-5068) will be evaporated as described in Sections 5.0 and 6.0, and the recovered radioactive material will be packaged and removed as appropriate for storage/disposal. For conservative PTE calculations, 2.5 percent of the inventory is considered alpha (as americium-241) and the balance is considered cesium-137 and strontium-90 in a 2:1 ratio (65 percent and 32.5 percent, respectively). To account for the remaining residual material in the REC, this 5.0 E+4 Ci has been tripled to provide a conservative estimated of approximately 1.5 E+5 Ci to represent the 324 Building residual material.

10.6 OTHER 324 BUILDING AND ANCILLARY BUILDINGS SOURCE MATERIAL

The wastewater diverter tank outside of 324 Building has an estimated 2.6 E-8 Ci of alpha contamination and 3.2 E-6 Ci of beta/gamma contamination. The liquid in the wastewater diverter tank (approximately 1,900 liters of rainwater infiltration) was characterized using the PTRAEU NOC, and future disposal of the liquid is addressed in Sections 5.0, 6.0, and 9.0 of this NOC.

It is difficult to assess the total inventory source material associated with ductwork, piping, laboratories/rooms, hoods, etc., in the 324 Building because of the high background associated with the REC and SMF source material and the indeterminate locations and distributions of the REC and SMF source material. There is an estimated 13 Ci of cesium-137 on the A-frame filters. An inventory of 100 Ci was chosen conservatively as a bounding envelope for all other source material in the 324 Building not described already for the REC, HLV, or SMF. The same isotopic ratios described in Section 10.5 for americium-241, cesium-137, and strontium-90 have been used (i.e., 2.5 percent of the 100 Ci is americium-241 and the balance is considered cesium-137 and strontium-90 in a 2:1 ratio, 65 percent and 32.5 percent respectively).

11.0 PHYSICAL FORM

Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas.

The physical form of each radionuclide of concern in the inventory is listed in Table 1.

12.0 RELEASE FORM

Indicate the release form of each radionuclide in inventory: Particulate solids, vapor or gas. Give the chemical form and ICRP 30 solubility class, if known.

Gaseous or vaporous radionuclides present in the SNF located in the REC (Section 10.4) are bound in the matrix of the fuel, and so are considered solids. The irradiated materials in the SMF (Section 10.3) also are considered solids. For purposes of emission or offsite dose estimates, all other emissions from the radionuclides in the inventory presented in Table 1 are assumed released as particulate solids. Although the evaporation process described in Section 5.0 will heat the aqueous solutions to boiling, the radionuclides in the inventory are metals and salts that have a boiling point well above 100° Centigrade, and so will remain as particulate solids, rather than be released as a vapor or gas.

13.0 RELEASE RATES

Give the predicted release rates without any emissions control equipment (potential to emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section. Indicate whether the emission unit is operating in a batch or continuous mode.

The predicted release rates for each radionuclide, without any emissions control equipment (unabated), are presented in Table 1 using the appropriate WAC 246-247-030 (21)(a) release fractions. A very conservative assumption is used that all the work is accomplished in a single year. The total potential release rates for the radionuclides of concern (unabated) are summarized in Table 2. The predicted release rates using the control equipment efficiencies in Section 6.0 (abated) also are presented in Table 2.

Emissions reported for 1996 (DOE/RL-97-43) from the 324 Building stack (EP-324-01-S) were 1.07 E-7 Ci of strontium-90, 2.5 E-6 Ci of cesium-137, 1.2 E-8 Ci of plutonium-238, and 2.4 E-8 Ci of americium-241. These emissions were the basis for the most recent stack assessment (HNF-1974) that confirmed the designation of the 324 Building stack as a major stack. Emissions reported for 2000 (DOE/RL-2001-32) from the 324 Building stack were 1.6 E-7 Ci of strontium-90, 8.5 E-8 Ci of cesium-137, 1.4 E-8 Ci of plutonium-239/240, and 8.5 E-9 Ci of americium-241. Plutonium-238 emissions were less than detection limits in 2000. Cobalt-60 has been below detection limits for at least the past 10 years.

The 324 Building stack (EP-324-01-S) will operate in continuous mode; however, the emission calculations conservatively assume that the entire inventory would remain each year, when in fact, the PTE will be reduced each year as the inventory is reduced. The actual and potential fugitive emissions from the proposed activities are not expected to be measurable and are, therefore, not included in Tables 1 and 2.

14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

Identify the MEI by distance and direction from the emission unit.

The MEI is located approximately 550 meters west northwest of the 324 Building (non-DOE-RL operations in the Washington State University Laboratory).

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Calculate the TEDE to the MEI using an approved procedure. For each radionuclide identified in sub section (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any existing controls using the release rates from subsection 13 of this section. Provide all input data used in the calculations.

The calculated results are summarized in Table 2 (324 Building PTE). The CAP88-PC model was used, with Hanford Site defaults. The MEI was assumed to be an onsite non-DOE contractor worker assumed to work 8,766 hours per year, with ingestion of regionally grown food and 24-hour per day access. The unit dose factor results for selected radionuclides are listed in PNNL 2001. For conservative PTE calculations, all activation products are considered cobalt-60, all fission products are considered cesium-137 and strontium-90 (in a 2:1 ratio), and all alpha radionuclides are considered americium-241. The total unabated dose for this NOC conservatively is estimated to be 8.2 E+2 mrem per year to the MEI, with a total abated dose estimate of 4.2 E-1 mrem per year to the MEI.

16.0 COST FACTOR IF NO ANALYSIS

Provide cost factors for construction, operation and maintenance of the proposed control technology components and the system, if a BARCT or ALARACT demonstration is not submitted with the NOC.

Pursuant to WAC 246-247-110, App. A (16), cost factors for construction, operation, and maintenance of proposed technology requirements are not required, as the following is provided as a best available radionuclide control technology (BARCT) demonstration.

WDOH has provided guidance that HEPA filters generally are BARCT for particulate emissions (AIR 92-107). Because the radionuclides of concern are particulates, it is proposed that the controls described in Section 6.0 for the 324 Building stack (EP-324-01-S) be accepted as BARCT. Compliance with the substantive BARCT technology standards is described in Section 18.0.

17.0 DURATION OR LIFETIME

Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

Deactivation efforts under the approved active NOC are ongoing. Additional activities covered by this NOC revision will take place through fiscal year 2007.

18.0 STANDARDS

Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit described in this application:

ASME/ANSI AG-1, ASME/ANSI N509, ASME/ANSI N510, ANSI/ASME NQA-1, 40 CFR 60, Appendix A Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17, and ANSI N13.1

For each standard not so indicated, give reasons to support adequacy of the design and operation of the emission unit as proposed.

The abatement control system for the 324 Building stack (EP-324-01-S) was installed in 1966, before this requirement for control technology standards was specified in WAC 246-247 (April 1994). Although the listed technology standards, if available at time of construction, might have been followed as guidance, there was no regulatory requirement for compliance with the listed standards.

The 324 Building is a Hazard Category 2 nonreactor nuclear facility. The hazards analysis requirements, including control technology specifications, for a Category 2 facility are quite stringent, and currently are found in DOE orders and standards. These requirements form the foundation for the Authorization Basis for the 324 Building.

The *324 Building Safety Analysis Report* [(SAR), HNF-SD-SPJ-SAR-001-R3] was updated and approved by DOE-RL. The SAR and corresponding *324 Building Operational Safety Requirements* (HNF-SD-SPJ-OSR-001-R3) define the operating limits, surveillance requirements, administrative controls, and design features necessary to protect the health and safety of the public and onsite workers, and to minimize the risk to workers from an uncontrolled release of radioactive or other hazardous material.

Per WAC 246-247-120, App. B, *The BARCT demonstration and the emission unit design and construction must meet, as applicable, the technology standards shown below if the unit's PTE exceeds 0.1 mrem/yr TEDE to the MEI. If the PTE is below this value, the standards must be met only to the extent justified by a cost/benefit evaluation.*

The technology standards in Section 18.1 of this NOC were written after the airborne emission controls in the 324 Building were built, and so were not applicable at the time of construction. Adequacy of the design is supported by operational history, maintenance, inspections, and testing, which demonstrate that the intent of the substantive standard is met, as described in the following. In lieu of strict compliance with the current listed standards, or a list of the standards to which the ventilation system actually was designed and built, the 324 Building relies on a performance-based approach.

Operational history, routine maintenance, testing, and inspections demonstrate adequacy of the design and operation of the existing abatement control technology as proposed. A summary is provided in Table 3 of the standards and the status of conformance by the ventilation and monitoring systems. Cited documents will be provided to WDOH on request.

18.1 COMPLIANCE WITH BEST AVAILABLE RADIOLOGICAL CONTROL TECHNOLOGY STANDARDS

- ASME/ANSI AG-1 (first promulgated in 1985, and revised in 1991, 1994, and 1997):

Current design and operational requirements for nuclear air treatment systems are contained in the American Society of Mechanical Engineers/American National Standards Institute (ASME/ANSI) AG-1 *Code on Nuclear Air and Gas Treatment*. The 324 Building was commissioned in 1966, before any of the design standards were promulgated, and included the A-frame filters for the REC, Zone I final filters (Rooms 9,10, and 11), and Zone II final filters (Rooms 6 and 7). The codes and standards have evolved over the past 35 years, and the 324 Building ventilation system has been modified when necessary to meet the intent of the evolving standards.

ASME/ANSI AG-1 has replaced ASME/ANSI N509-1989, *Nuclear Power Plant Air-Cleaning Units and Components* (previous versions were issued in 1980 and 1976), but ASME/ANSI N510-1989, *Testing of Nuclear Air Treatment Systems* (previous versions were issued in 1980 and 1975), remains in force. Recognizing not all systems were built to N509-1989 requirements, N510-1989 allows applicable code sections to be used as technical guidance in the development of filter testing programs on air treatment systems designed according to other criteria.

The section in AG-1 (Section FC) that covers HEPA filters is applicable to replacement filters for the 324 Building ventilation system. Replacement filters (HNF-S-0552, *Specification for Procurement and Onsite Storage of Nuclear Grade High-Efficiency Particulate Air (HEPA) Filters*) are nuclear grade HEPA filters that meet all but the AG-1 requirement dealing with filter qualification testing. Justification for this sitewide exception was discussed with WDOH at the December 1998 Routine Technical Assistance Meeting and was approved by WDOH. A WDOH-approved temporary deviation is currently in place to satisfy this issue (AIR 99-507).

Original filters met Hanford Works Standard (HWS-7511-S), *Standard Specification for Wood Frame High-Efficiency Particulate Air Filters*, which covered fire resistance, moisture resistance, filter efficiency (penetration), flow resistance, and filter frame integrity. The most recent filter changes (Room 6 last changed in 1990, Room 7 last changed in 1997, Room 9 last changed in 1987, Room 10 last changed in 1977, and Room 11 installed in 1987 and changed in 2001) met criteria in N509, Section 5.1 and military specifications MIL 51068 and 51079.

The 324 Building ventilation system was built to the construction specifications found in *Specifications for Fuels Recycle Pilot Plant, Building 324* (HWS-5967), and included specifications for the fans [Air Moving and Conditioning Association (AMCA) Class I construction requirements], dampers, welding requirements, HEPA filters (HWS-7511-S), ductwork (HWS-7508-S-R1, *Low Pressure Air Ducts*), and acceptance procedures. Some of the cited references (HWS-7511-S, HWS-7508-S-R1) are obsolete and are not available, but were incorporated by reference into HWS-5967. Military specifications (MIL 51068, MIL 51079) for HEPA filters, formerly referenced in ANSI N509, are obsolete, having been replaced by AG-1.

Some sections in AG-1 are not applicable, e.g., adsorbers or moisture separators. Other sections are addressed by operational adequacy, as the system has been operating for many years and has been providing the necessary flow rate and pressure to support operations in the building.

- ASME/ANSI N509 (first promulgated in 1976, and revised in 1980 and 1989):

The 324 Building stack (EP-324-01-S) HEPA filtration system was built before ANSI N509 was written. Adequacy of the design has been evaluated as part of the report (HNF-6905) described under ANSI N510. The ventilation system was inspected by WDOH on June 24, 1998 (and subsequent annual inspections) as an EPA Level II Inspection without any significant findings.

Adequacy of the HEPA filters and housings has been demonstrated by operational history and successful testing in accordance with guidance provided in N510. The existing system has been tested successfully annually in its current configuration since before April 1994 (implementation of technology standards requirements in WAC-246-247).

- ASME/ANSI N510 (first promulgated in 1975, and revised in 1980 and 1989):

As allowed in N510, certain sections of N510 can be used as technical guidance for non-N509 systems. To demonstrate the adequacy of the system design and operation, the final stage HEPA filters are aerosol-tested in-place annually (at a minimum control efficiency of 99.95 percent) to meet the intent of N510. This annual testing includes a visual inspection of the housing as described in ANSI N510. Adequacy of the HEPA filter-testing methodology used at the 324 Building is addressed in HNF-6905.

The 324 Building staff has documented the technical basis for acceptability of the testing method for those HEPA filtered ventilation systems that were designed and constructed before 1976. A formal review of the aerosol test procedures used to perform the efficiency testing of the operating HEPA filter systems located in the 324 Building has been completed (HNF-6905). Two checklists were developed to support this review. The checklists identified all essential elements of a HEPA filter-testing program consistent with the provisions of N510. The first checklist was used to evaluate the test procedure. The second checklist was used to evaluate the system credentials and physical design configuration.

The first checklist was used to evaluate aspects of the annual HEPA filter testing procedures including visual inspections, instrument accuracy and calibration, HEPA filter test methods and parameters, HEPA filter bypass leakage inspections and testing, testing of adsorbers (not applicable, in this case, as not present in 324 Building), inspection and testing of moisture eliminators and air heaters, and filter housing leak testing. The second checklist was used to evaluate the system credentials and design attributes including location of aerosol injection and sample ports; history of acceptance tests required by N510 such as airflow capacity tests, airflow distribution tests, air-aerosol mixing uniformity tests; and sample manifold qualification tests required by N509. These evaluations were performed by reviewing the annual HEPA filter efficiency procedures combined with general design information provided in facility drawings.

The evaluations in HNF-6905 concluded that consistent with the declining risks (as inventory is removed from the 324 Building) and limited building life, no major upgrades to the ventilation systems are planned or warranted. Specific recommendations have been made to revise aerosol procedures to the extent practical to improve compliance with the requirements of N510, and are contained in Appendix A of the report. Appendix A identifies inspection, testing, design, and qualification requirements; the status or applicability of the compliance requirements; and justification for deviations from the requirements.

- ANSI/ASME NQA-1 (first promulgated in 1985):

NQA-1 sections addressing abatement technology components design had not been promulgated at the time of system construction and so are not addressed (recent filter changes did meet applicable NQA-1 criteria). Quality assurance for sampling of emissions and subsequent analysis is addressed in HNF-0528, *NESHAP Quality Assurance Project Plan for Radioactive Airborne Emissions* (all of Sections 2.0, 3.0 and 5.0), which was written in accordance with applicable NQA-1 requirements.

- ANSI/ASME NQA-2:

The standard is no longer an active National Standard and has been incorporated into NQA-1. Compliance compatible with NQA-1 was described previously.

- 40 CFR 60, Appendix A

Stack flow is tested using Methods 1 and 2. Methods 1A, 2A, 2C, and 2D are not applicable to the stack dimensions/design. Relative humidity (as allowed in Method 2) is measured with a calibrated hygrometer or with wet and dry bulb readings. Methods 4, 5, and 17, which provide a method for measuring relative humidity for combustion sources, are not applicable to radioactive airborne effluent stacks.

- ANSI N13.1:

The sampling system for the 324 Building stack (EP-324-01-S) was upgraded in 1993 to meet ANSI N13.1-1969 criteria. The stack is listed in the *Federal Facility Compliance Agreement* (FFCA 1994) as fully compliant. The probe location is a minimum of five stack diameters downstream from abrupt changes in flow direction. Sample tubing and number of bends are minimized as much as physically practical. Because the stack will be shut down on completion of activities in this NOC, there are no plans to upgrade the airborne effluent sampling system to the ANSI N13.1-1999 criteria. A downgrade to minor stack status likely will be requested for the 324 Building Stack (EP-324-01-S) during the span of this NOC, as soon as sufficient source term is removed from the 324 Building to warrant the downgrade.

Adequacy of the sampling system is demonstrated by inspection, calibration, and maintenance activities as scheduled in current 324 Building procedures.

18.2 ENVIRONMENTAL, ENERGY, AND ECONOMIC IMPACTS OF BEST AVAILABLE RADIOLOGICAL CONTROL TECHNOLOGY

A replacement system that is in full compliance with the BARCT technology standards and the existing HEPA filtration system (both use HEPA filtration, which already has been accepted as BARCT to control particulates) was evaluated and compared for environmental impacts. The existing system will allow completion of the work described in this NOC, with the TEDE to the MEI as described in Section 15.0 and Table 2, for the period described in Section 17.0. The fully compliant replacement system would have those same impacts, plus the additional potential dose impacts (TEDE to MEI from existing source term in the 324 Building that will be removed with this NOC) from allowing the 324 Building radiological inventory to remain in place for several additional years. It could take 5 years to fund (congressional approval needed), design, permit, procure, and install a replacement system that is in full compliance with the BARCT technology standards. Completion of the work described in this

NOC will reduce potential TEDE to the MEI, as source term is removed from the 324 Building and transferred in a more stabilized form to other facilities that are a further distance from the MEI. The work described in this NOC is needed whether relying on the existing system or relying on a fully compliant replacement system. The potential exposure to the public from a 5-year delay is an adverse environmental impact of a fully compliant replacement system. There are additional adverse impacts from installation of a fully compliant replacement system, e.g., waste generation (radioactive and nonradioactive, air, and non-air), disposal and stabilization, construction of control equipment, and the health and safety to both radiation workers and to the general public.

The existing system and a fully compliant replacement system have been evaluated for energy impacts. The existing energy distribution system would be used for either option, so there are no energy impacts to consider for this BARCT compliance evaluation.

The existing system and a fully compliant replacement system have been evaluated for economic impacts. The fully compliant replacement system would have an increased cost roughly estimated at 5 million dollars (based on costs to replace the old 291-B-1 Stack with the new, fully compliant 296-B-1 Stack recently completed at the B Plant Complex). There would be no improved reduction in TEDE to the MEI for the replacement system as compared to the existing system, because both effectively are equal (minimum removal efficiency for particulates of 99.95 percent); therefore, the beneficial impact is zero. The ratio of economic to beneficial impact of the fully compliant replacement system is an estimated 5 million dollars for a net increase in estimated person-rem; thus, a fully compliant replacement system is not justified by cost/benefit evaluation.

The work described in this NOC involves a reduction in inventory at the 324 Building, and thereby reduces the risk to the public. Installing a fully compliant system would delay the inventory reduction work, and thereby delay this risk reduction. A fully compliant system would reduce the risk associated with the work described in this NOC, but would introduce greater additional risk because of delaying the cleanout work while transitioning to a fully compliant system. The most reasonable approach would be to use the existing system for this NOC to expedite removal of the radiological inventory from the 324 Building.

Pursuant to WAC 246-247, Appendix B, the most effective technology (i.e., a fully compliant replacement system) could be eliminated from consideration if a demonstration can be made to WDOH that the technology has unacceptable impacts. Because a fully compliant replacement system is not justified by cost/benefit evaluation or adverse environmental impacts because of delaying the work described in this NOC, it is proposed that the existing system, as described in Section 6.0 and meeting the intent of the technology standards in Section 18.1 of this NOC, be accepted as compliant with the BARCT technology standards.

19.0 REFERENCES

95-PCA-443, Letter, J. E. Rasmussen, DOE-RL to P. G. Millam, EPA, Region 10 and A. W. Conklin, WDOH, *Cleanout of the Waste Technology Engineering Laboratory, B-Cell*, August 4, 1995.

AIR 92-107, Letter, WDOH to DOE-RL, *Surveillance Report Generated by the DOH of KE & KW Basin on 09/16/1992*, October 05, 1992, Washington State Department of Health, Olympia, Washington.

AIR 95-903, Letter, Allen W. Conklin, WDOH, to James E. Rasmussen, DOE-RL, September 18, 1995, Washington State Department of Health, Olympia, Washington.

Air-99-507, Letter, Allen W. Conklin, WDOH, to James E. Rasmussen, DOE-RL, May 19, 1999, Washington State Department of Health, Olympia, Washington.

Air-01-608, Letter, Allen W. Conklin, WDOH, to Joel B. Hebdon, DOE-RL, June 26, 2001, Washington State Department of Health, Olympia, Washington.

ANSI N13.1-1969, *Guide to Sampling Airborne Radioactive Materials in a Nuclear Facility*, American National Standards Institute, New York, New York.

ANSI N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive substances from the Stacks and Ducts of Nuclear Facilities*, American National Standards Institute, New York, New York.

ANSI/ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*, 1994, American National Standards Institute and American Society of Mechanical Engineers, New York, New York.

ANSI/ASME NQA-2, *Quality Assurance Requirements for Nuclear Power Plants*, 1989, American National Standards Institute and American Society of Mechanical Engineers, New York, New York.

ANSI/NCSL Z540-1, *Calibration Laboratories and Measuring and Test Equipment – General Requirements*, 1994, American National Standards Institute, New York, New York.

ASME/ANSI AG-1, *Code on Nuclear Air and Gas Treatment*, 1991, American Society of Mechanical Engineers and American National Standards Institute, New York, New York.

ASME/ANSI-N509, *Nuclear Power Plant Air-Cleaning Units and Components*, 1989, American Society of Mechanical Engineers and American National Standards Institute, New York, New York.

ASME/ANSI N510, *Testing of Nuclear Air Treatment Systems*, 1989, American Society of Mechanical Engineers and American National Standards Institute, New York, New York.

DOE/RL-96-75, Rev. 2, *Radioactive Air Emissions Notice of Construction Portable/Temporary Radioactive Air Emission Units*, September 1999, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-97-43, *Radionuclide Air Emissions for the Hanford Site, Calendar Year 1996*, June 1997, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2001-32, *Radionuclide Air Emissions for the Hanford Site, Calendar Year 2000*, June 2001, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1996, Letter, Anita Frankel, U.S. Environmental Protection Agency, Region 10, to J. E. Rasmussen, DOE-RL, no subject, April 17, 1996.

EPA, 1999, Letter, Anita Frankel, U.S. Environmental Protection Agency, Region 10, to J. E. Rasmussen, DOE-RL, no subject, August 12, 1999.

EPA, 2001, Letter, Barbara McAllister, U.S. Environmental Protection Agency, Region 10, to Joel Hebdon, DOE-RL, no subject, June 29, 2001.

FFCA, 1994, *Federal Facility Compliance Agreement for Radionuclide NESHAP*, February 7, 1994, U.S. Environmental Protection Agency, Region 10 and U.S. Department of Energy, Richland Operations Office, Richland, Washington.

HNF-EP-0835, *Statement of Work for Services provided by the Waste Sampling and Characterization Facility for the Effluent and Environmental Monitoring Program,* Fluor Hanford, Richland, Washington, updated periodically.

HNF-0528, *NESHAP Quality Assurance Project Plan for Radioactive Airborne Emissions*, Fluor Hanford, Richland, Washington, updated periodically.

HNF-1974, *Hanford Site Radionuclide National Emission Standards for Hazardous Air Pollutants Stack Source Assessment*, February 1998, Fluor Hanford, Richland, Washington.

HNF-2883, Rev. 0, *Radioactive Material Continuous Inventory Status of Compliance With 324 Building SAR and OSR 3.1*, August 1998, B&W Hanford Company, Richland, Washington.

HNF-5068, Rev. 1A, *Project Management Plan for the 300 Area Special-Case Waste*, April 2001, Fluor Hanford, Richland, Washington.

HNF-6905, *324 Facility HEPA Filter Test Methods Evaluation Report*, September 2000, Fluor Hanford, Richland, Washington.

HNF-S-0552, *Specification for Procurement and Onsite Storage of Nuclear Grade High Efficiency Particulate Air (HEPA) Filters*, Revision 2, June 7, 2000, Fluor Hanford, Richland, Washington (replaced MIL 51068 and 51079).

HNF-SD-SPJ-OSR-001-Rev. 3, *324 Building Operational Safety Requirements*, 2001 , Fluor Hanford, Richland, Washington.

HNF-SD-SPJ-SAR-001-Rev. 3, *324 Building Safety Analysis Report*, 2001 , Fluor Hanford, Richland, Washington.

HWS-5967, *Specifications for Fuels Recycle Pilot Plant, Building 324, Project CAH-916*, November 15, 1962, General Electric, Hanford Atomic Products Operation, Richland, Washington (incorporated MWS-7508-S-R1 and HWS-7511-S).

PNNL 2001, Letter: L. H. Staven (PNNL) to L. P. Diediker (FH), July 9, 2001.

This page intentionally left blank.

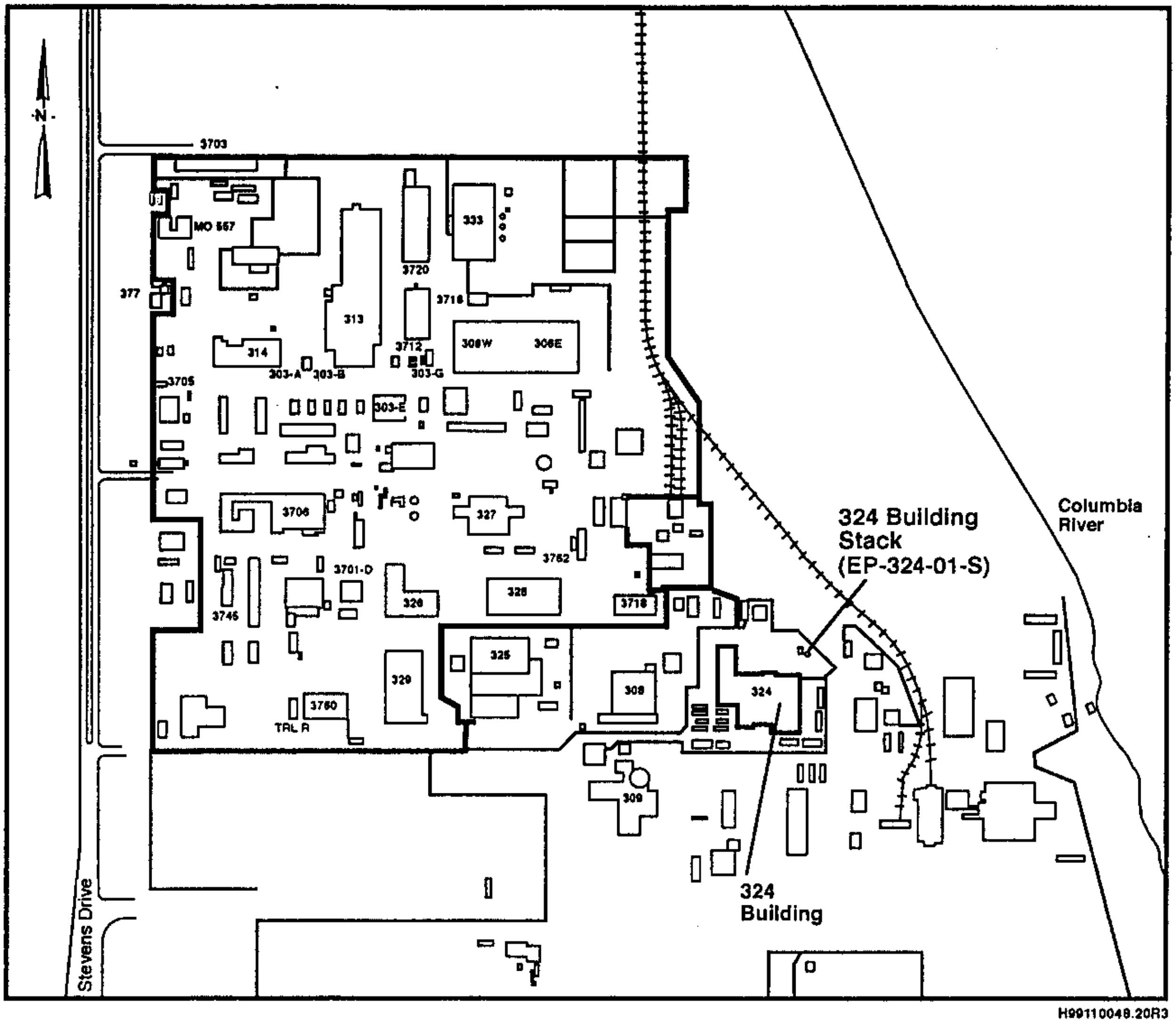


Figure 1. Location of 324 Building and the EP-324-01-S Stack in the 300 Area.

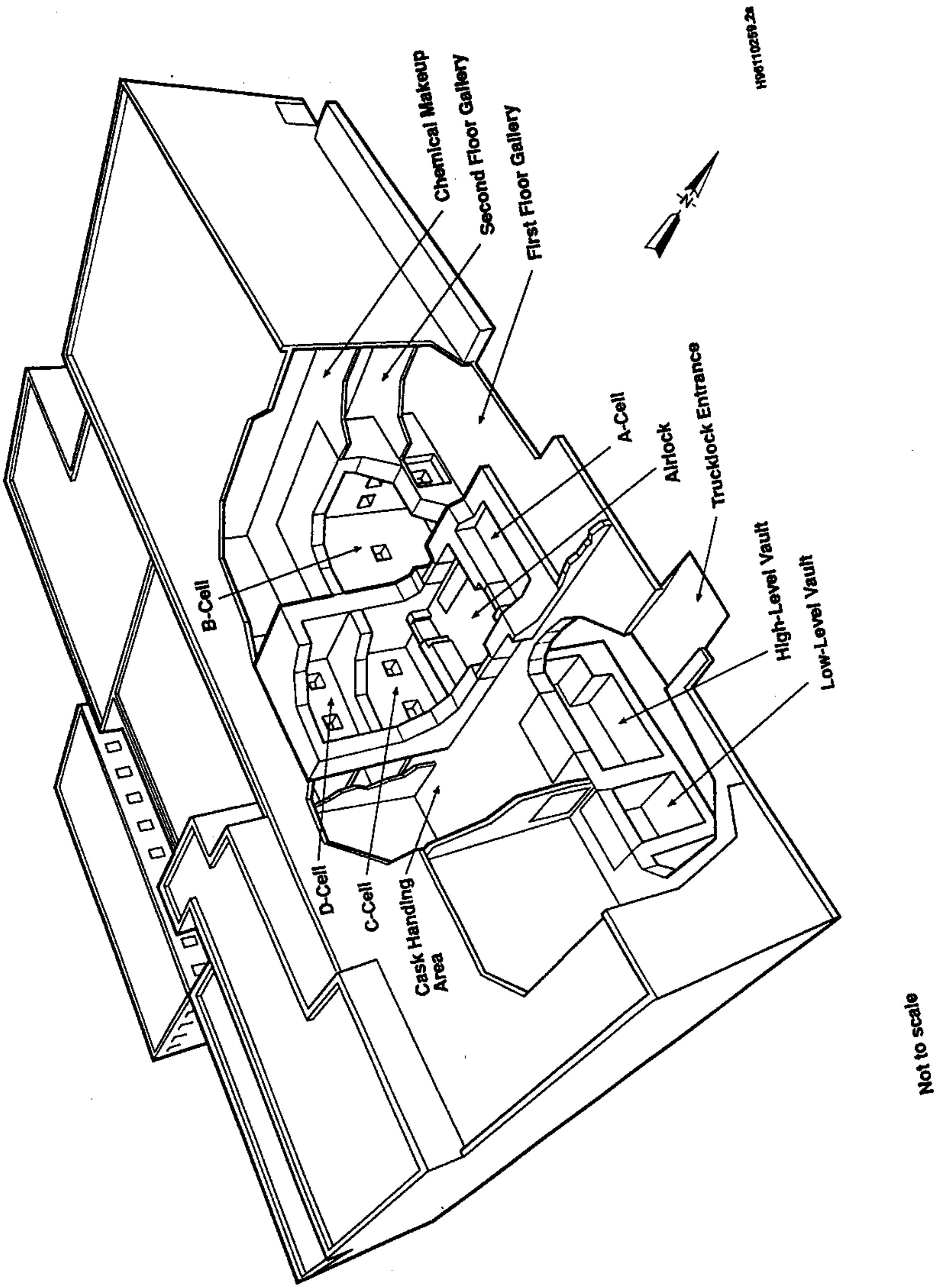
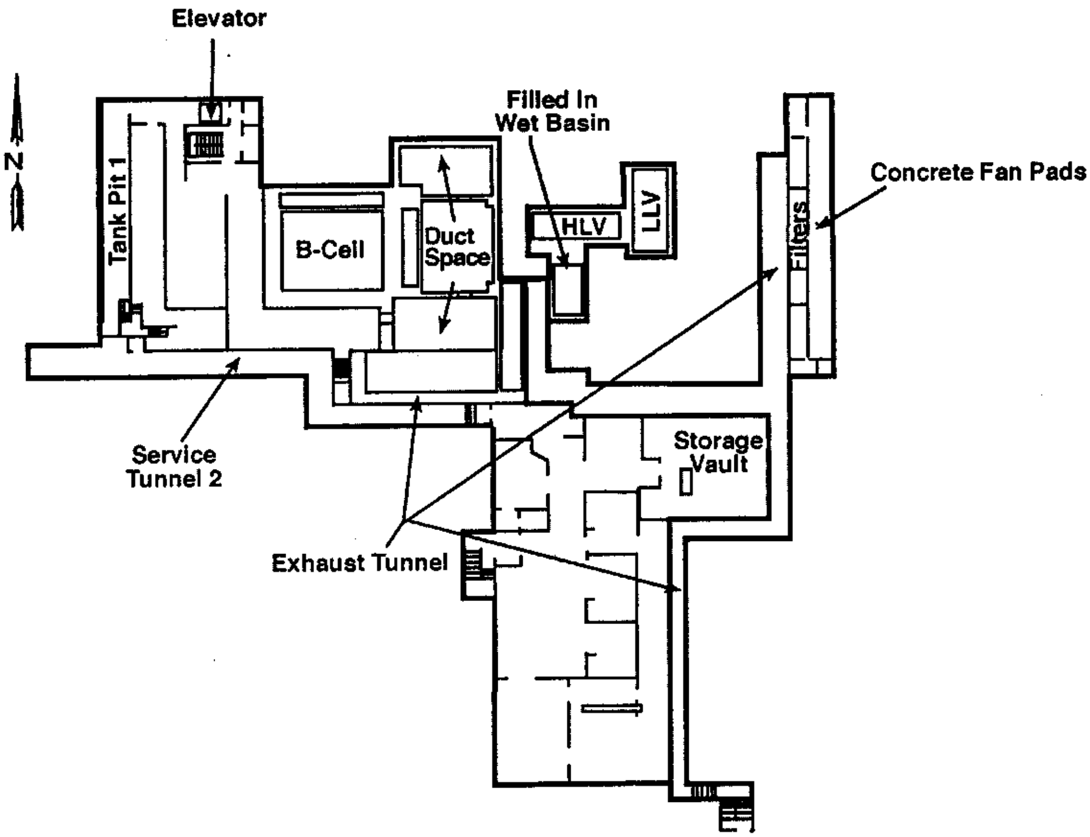
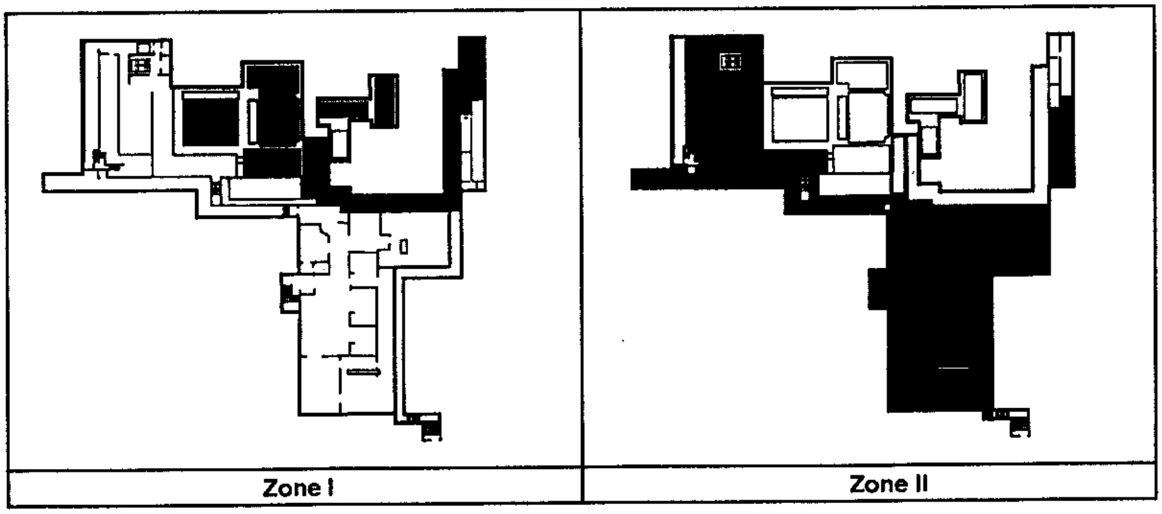


Figure 2. Cut-away of the 324 Building Showing the High-Level Vault, Low-Level Vault, and the Radiochemical Engineering Cells.



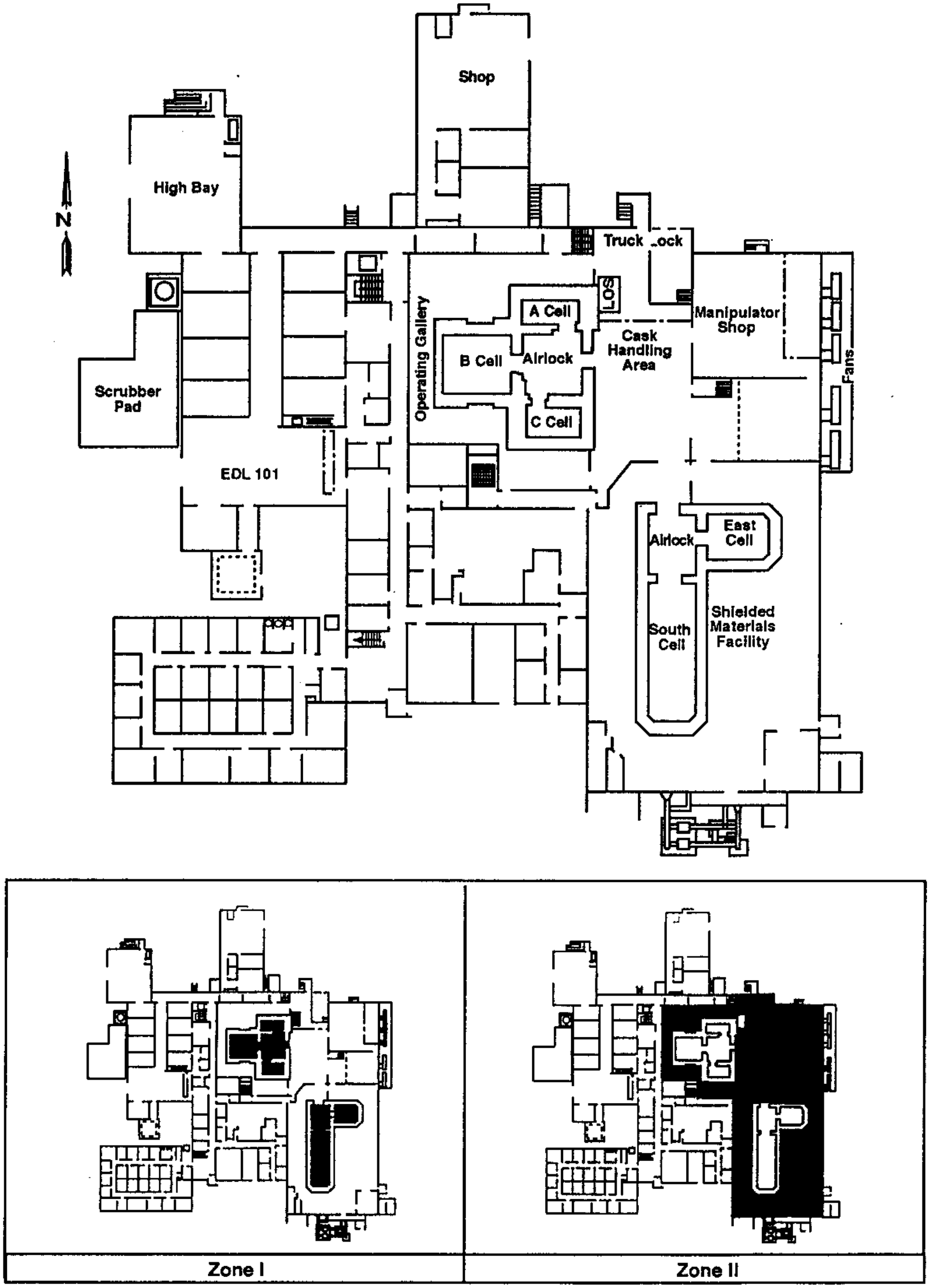


HLV = High-Level Vault
LLV = Low-Level Vault

H99110048.31R2

Indicates Areas of Ventilation System Control (Zones I and II, respectively)

Figure 3. 324 Building Floor Plans (Basement).



EDL = Engineering Development Laboratory
LOS = Loadout Stall

H99110048.21R3

Indicates Areas of Ventilation System Control (Zones I and II, respectively)

Figure 4. 324 Building Floor Plans (1st Floor).

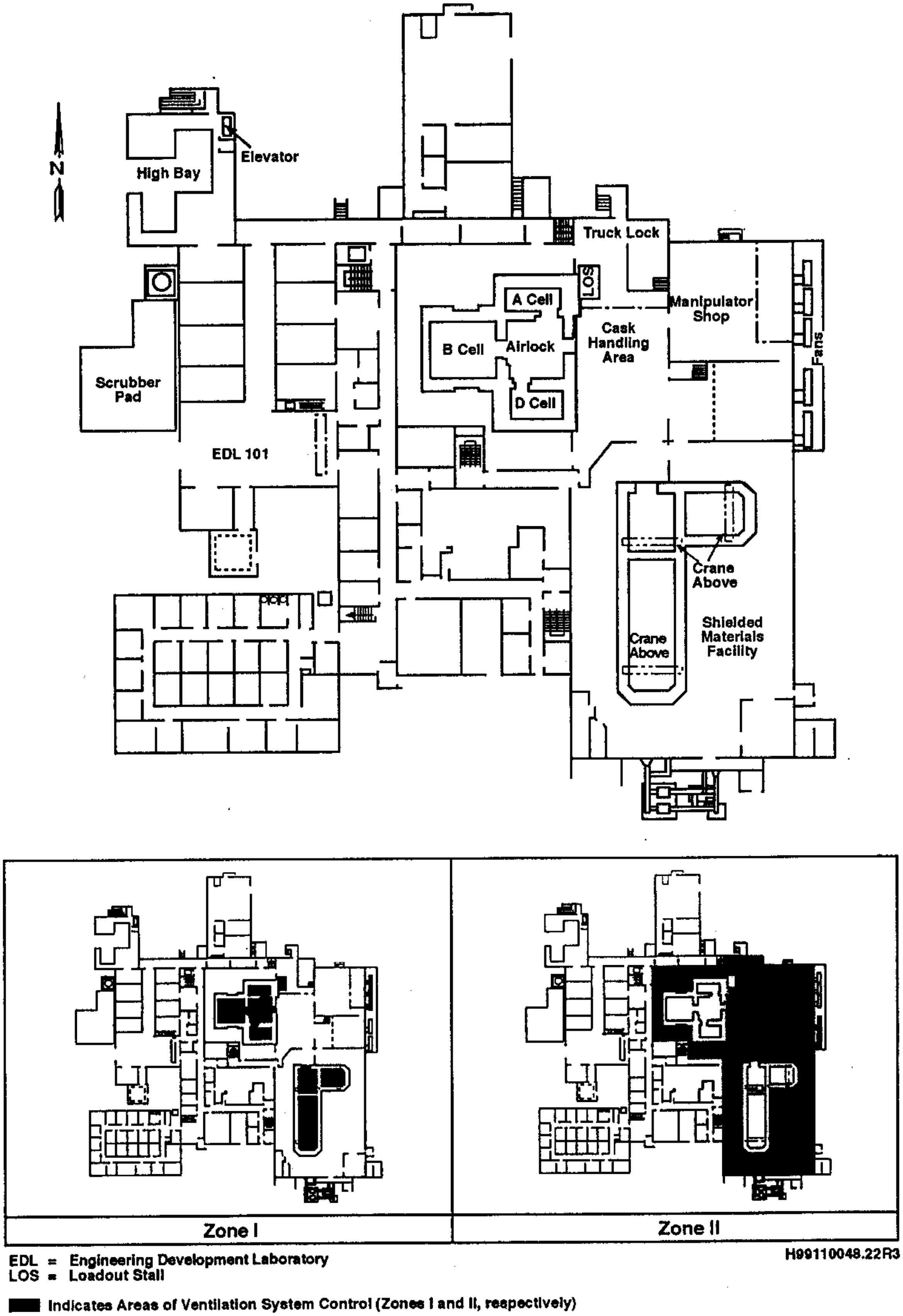


Figure 5. 324 Building Floor Plans (2nd Floor).

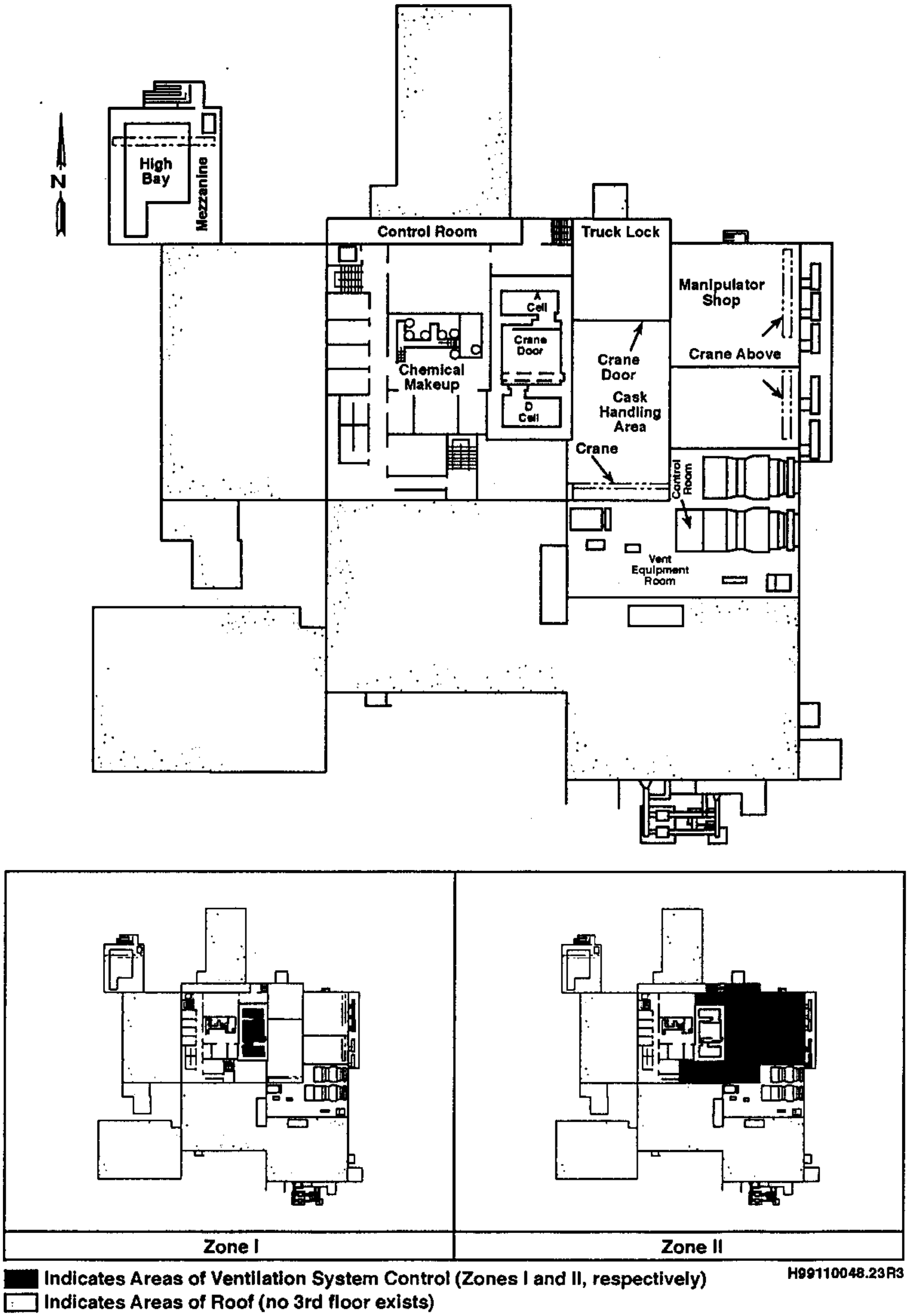


Figure 6. 324 Building Floor Plans (3rd Floor).

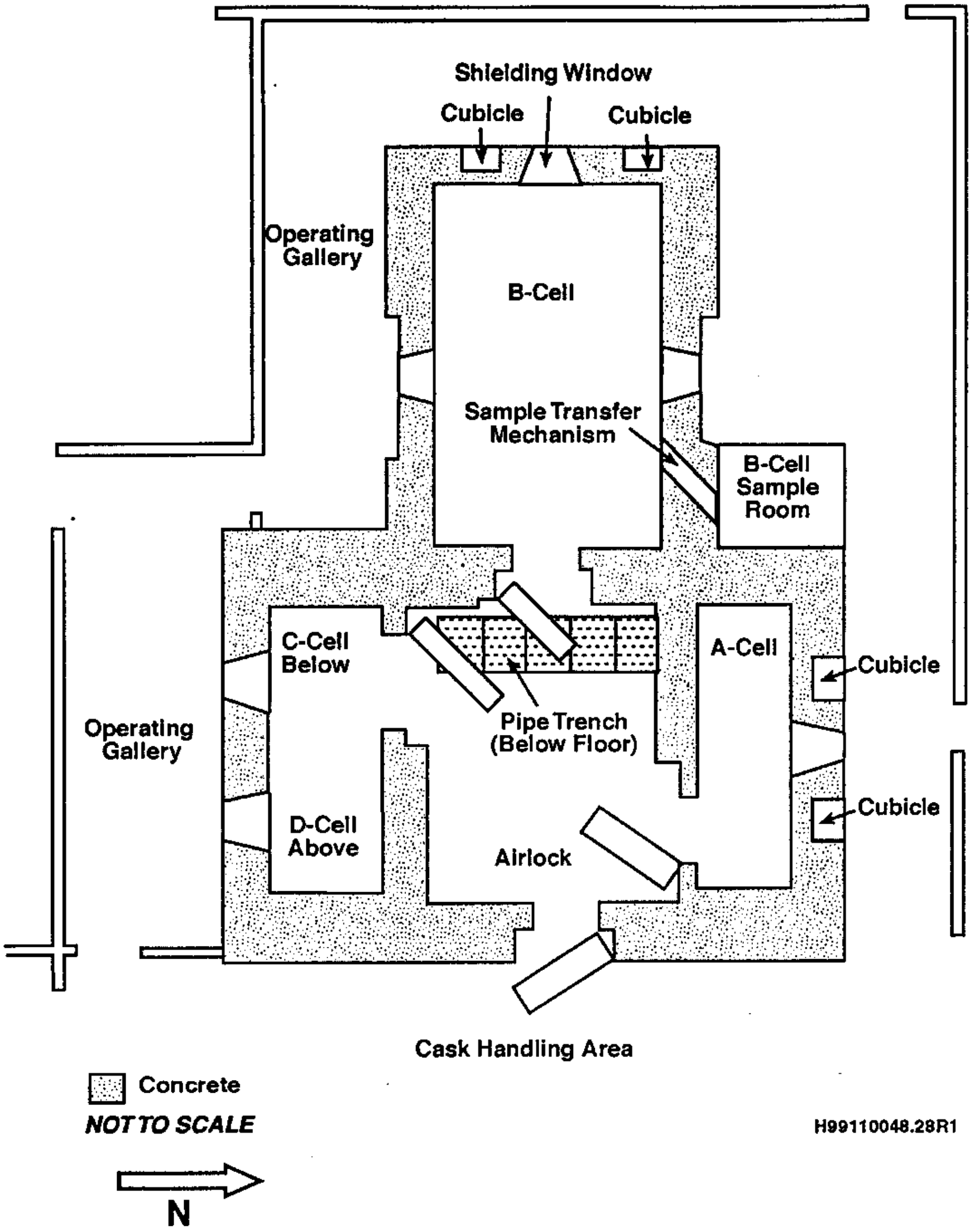


Figure 7. Radiochemical Engineering Cells Layout.

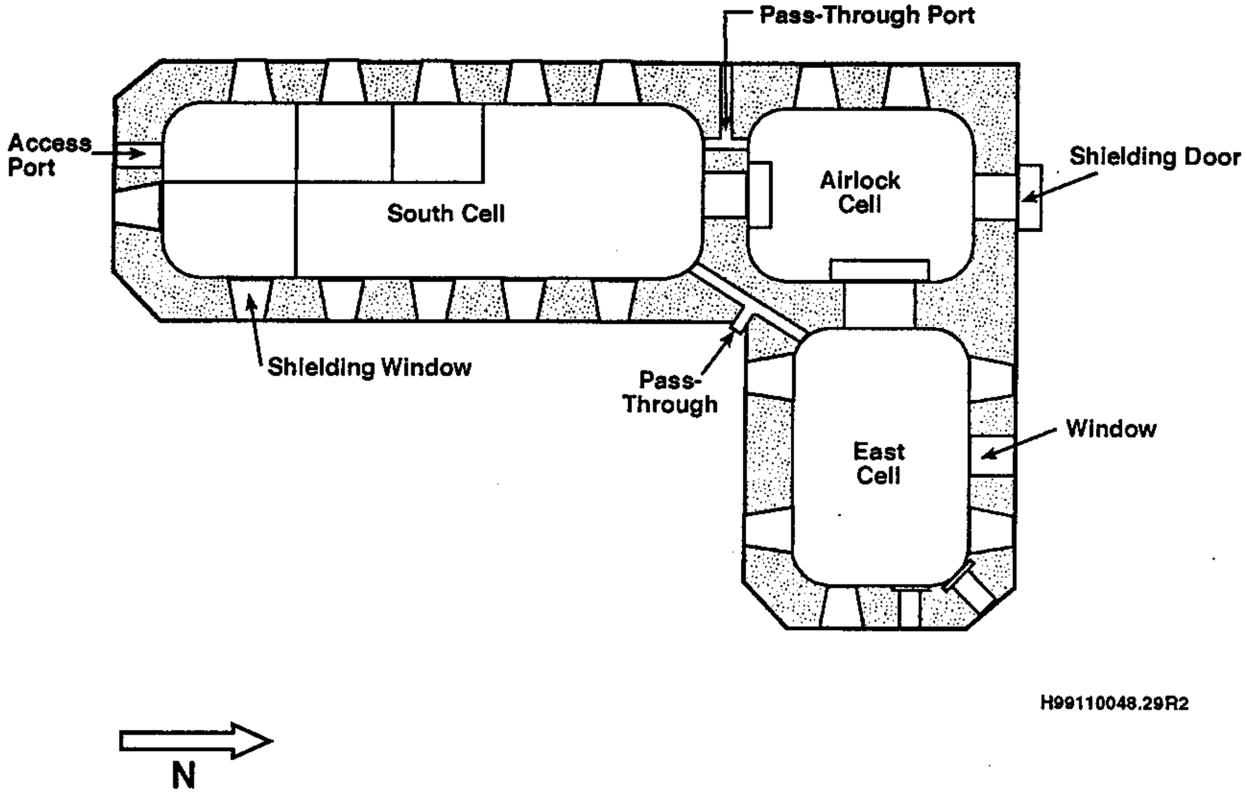


Figure 8. Shielded Materials Facility Layout.

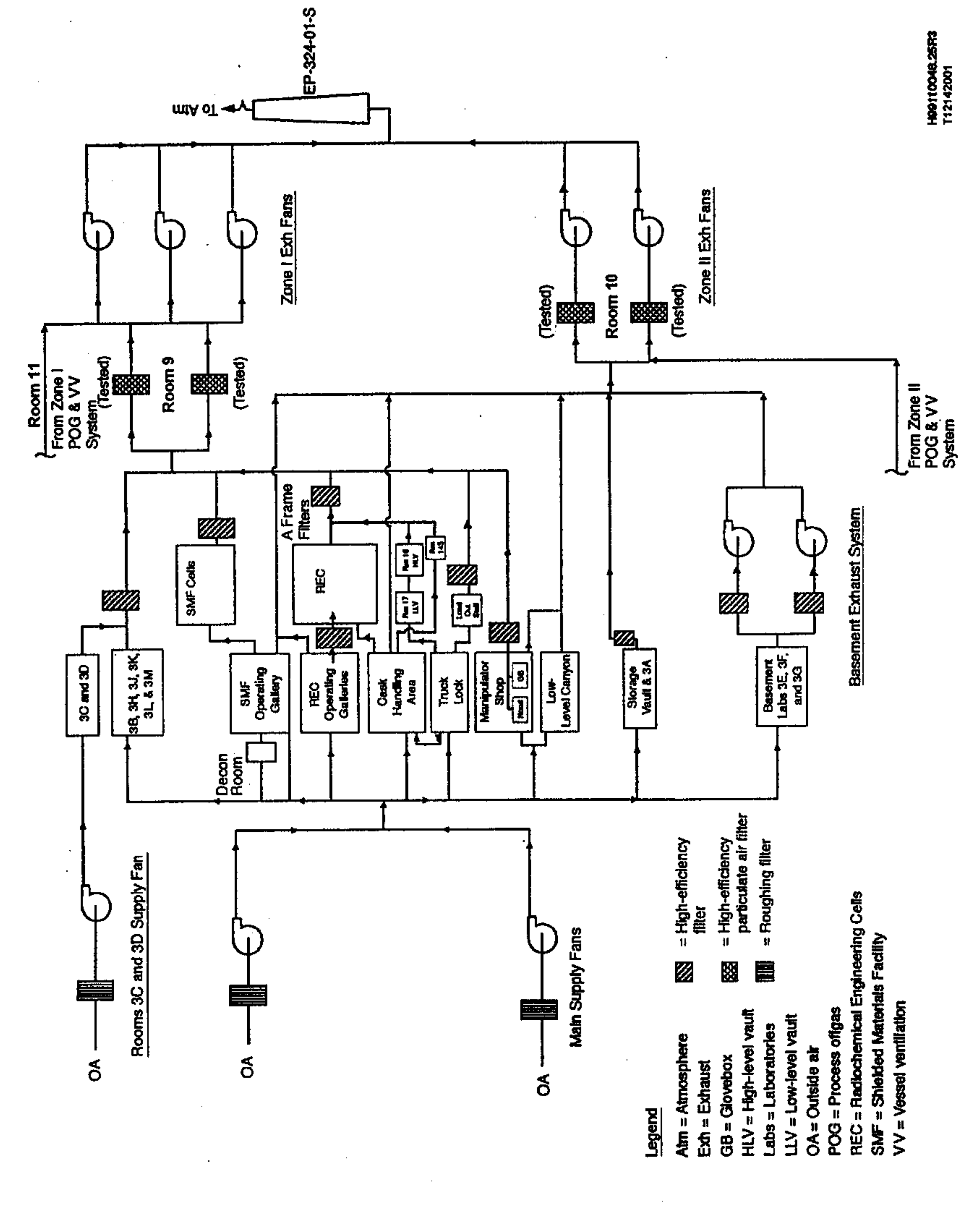
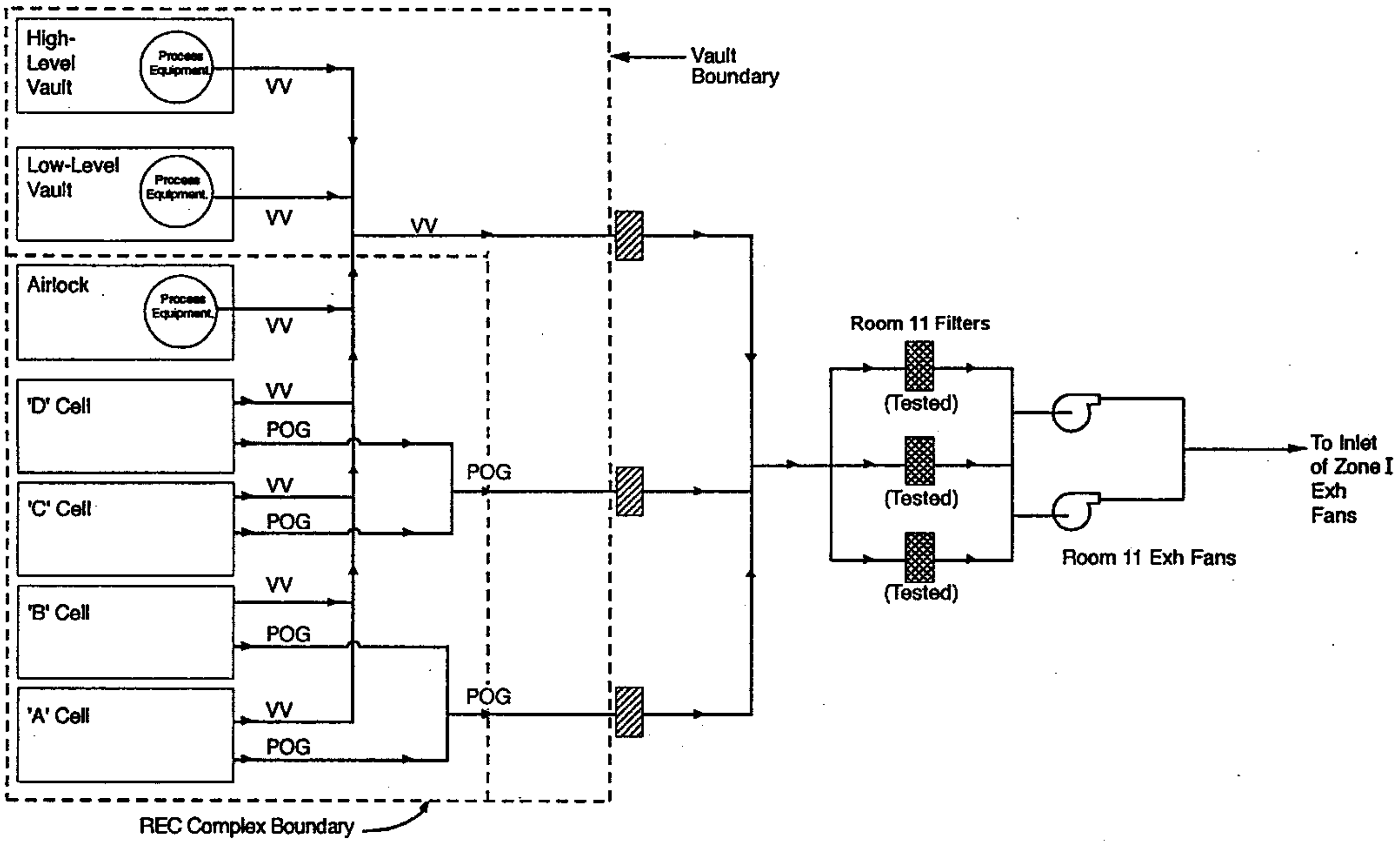


Figure 9. 324 Building Ventilation Flow Diagram, Zones I and II.

011214.1148



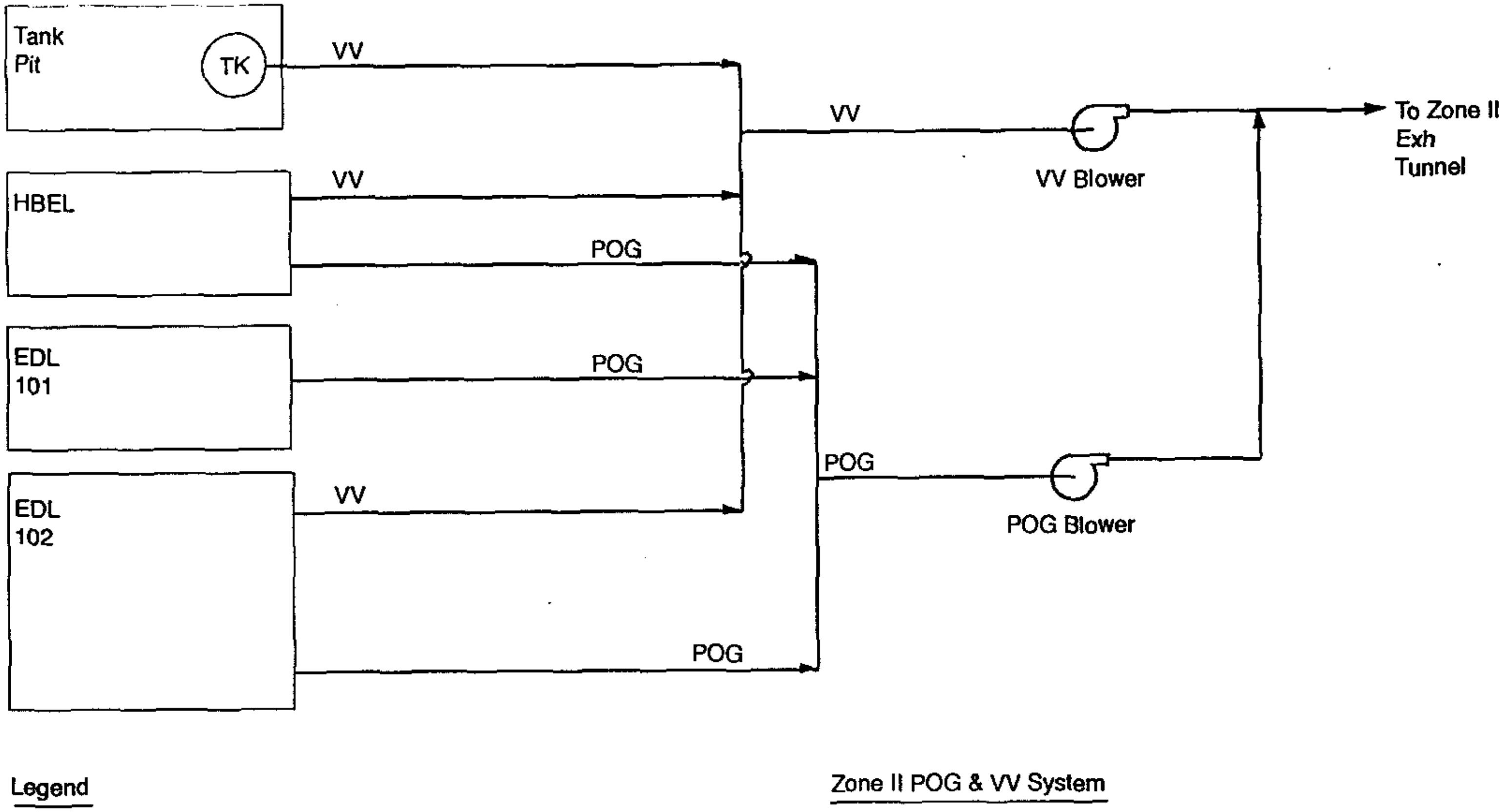
Zone I POG & VV System

Legend

Exh = Exhaust
REC = Radiochemical Engineering Cells
POG = Process offgas
VV = Vessel ventilation
= High-efficiency filter
= High-efficiency particulate air filter

H99110048.26R3
T12142001

Figure 10. Zone I Process Offgas and Vessel Ventilation System.



Legend

Atm = Atmosphere
EDL = Engineering Development Laboratory
Exh = Exhaust
HBEL = High Bay Engineering Laboratoy
POG = Process offgas
TK = Tank
VV = Vessel ventilation

H99110048.24R2

Figure 11. Zone II Process Offgas and Vessel Ventilation System.

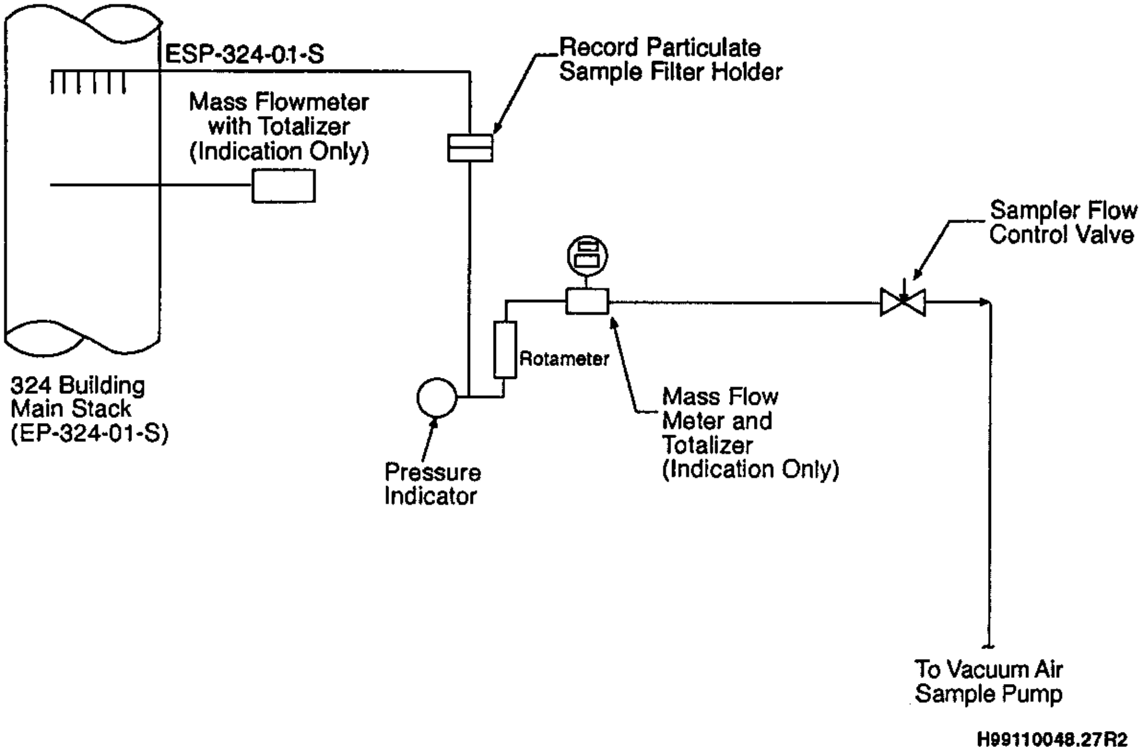


Figure 12. Schematic Diagram of Near-Isokinetic Stack Sampling Systems.

Table 1. 324 Building Deactivation Inventory.

Radionuclides	Physical Form	Inventory (curies)	WAC 246-247 Release Fraction	Potential Release (curies/year)
High-Level Vault/Low-Level Vault Heels (Section 10.2)				
Sr-90	particulate	6.99 E+3	1.0 E-3	6.99E+0
Cs-137	particulate	1.40 E+4	1.0 E-3	1.40 E+1
Am-241 (alpha)	particulate	5.38 E+2	1.0 E-3	5.38 E-1
Shielded Materials Facility (Section 10.3)				
C0-60	solid	2.77 E+5	1.0 E-6	2.77 E-1
Cs-137	particulate	1.00 E+3	1.0 E-3	1.00 E+0
Spent Nuclear Fuel (Section 10.4)				
Sr-90	solid	2.28 E+5	1.0 E-6	2.28 E-1
Sr-90	particulate	7.70 E+3	1.0 E-3	7.70 E+0
Cs-137	solid	4.55 E+5	1.0 E-6	4.55 E-1
Cs-137	particulate	1.54 E+4	1.0 E-3	1.54 E+1
Am-241 (alpha)	solid	1.75 E+4	1.0 E-6	1.75 E-2
Am-241 (alpha)	particulate	5.93 E+2	1.0 E-3	5.93 E-1
Decontamination/Evaporation (Section 10.5)				
Sr-90	particulate	5.20 E+4	1.0 E-3	5.20 E+1
Cs-137	particulate	1.04 E+5	1.0 E-3	1.04 E+2
Am-241 (alpha)	particulate	4.00 E+3	1.0 E-3	4.00 E+0
Other 324 Building Source Material (Section 10.6)				
Sr-90	particulate	3.25 E+1	1.0 E-3	3.25 E-2
Cs-137	particulate	6.50 E+1	1.0 E-3	6.50 E-2
Am-241 (alpha)	particulate	2.50 E+0	1.0 E-3	2.50 E-3

Table 2. 324 Building Deactivation Potential-to-Emit.

Radionuclides	Potential Unabated Release (curies/year)	Potential Abated Release (curies/year)	Dose Factor CAP88-PC* (millirem/curie)	Unabated Onsite Public Dose (millirem/year)	Abated Onsite Public Dose (millirem/year)
Co-60	2.8 E-1	1.4 E-4	2.51 E+0	7.0 E-1	3.5 E-4
Sr-90	6.7 E+1	3.4 E-2	4.96 E-2	3.3 E+0	1.7 E-3
Cs-137	1.3 E+2	6.5 E-2	2.24 E+0	2.9 E+2	1.5 E-1
Am-241 (alpha)	5.2 E+0	2.6 E-3	1.02 E+2	5.3 E+2	2.6 E-1
Total				**8.2 E+2**	**4.2 E-1**

* PNNL 2001

Table 3. Status of Conformance to Technology Standards.

STANDARD	REQUIREMENT	STATUS
ANSI/ASME AG-1	Fans	Constructed to HWS-5967 (built before AG-1 implemented)
	Ductwork	Constructed to HWS-5967 (built before AG-1 implemented)
	HEPA filters	Applicable to replacement HEPA filters, conforms as described in Section 18.1 (HNF-6905)
	Dampers	Constructed to HWS-5967 (built before AG-1 implemented)
	Quality assurance	Constructed to HWS-5967 (built before AG-1 implemented)
ASME/ANSI N509	Ductwork, filters, filter housings, dampers	Constructed to HWS-5967 (built before N509 implemented) Meets intent of N509 per N510 testing (HNF-6905)
ASME/ANSI N510	Visual inspection	Performed annually (with no significant findings identified); conforms to requirement (HNF-6905)
	Aerosol test	Performed annually; meets intent of N510 requirements as described in Section 18.1 (HNF-6905)
ANSI/ASME NQA-1	Design requirements	HWS-5967 (built before NQA-1 implemented)
	Sampling and analysis procedures	Complies with HNF-0528; conforms to applicable NQA-1 requirements
40 CFR 60, Appendix A	Methods 1 and 2	Applicable (annual testing conforms to requirements)
	Methods 1A, 2A, 2C, 2D, 4, 5, and 17	Not applicable
ANSI 13.1 (1969)	Equal annular nozzle spacing, near isokinetic sampling and other requirements	Listed as compliant in *Federal Facility Compliance Agreement* (FFCA 1994)

This page intentionally left blank.

DISTRIBUTION

MSIN

J. Leitch
United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington, 98101

A. W. Conklin
Washington State Department of Health
7171 Cleanwater Lane, Building 5
Olympia, Washington 98504

J. W. Schmidt
Washington State Department of Health
PMB 835
2839 W. Kennewick Avenue
Kennewick, Washington 99336

Dirk A. Dunning
Oregon Office of Energy
625 Marrian Street N.E., Suite 1
Salem, OR 97301-3742

R. Gay
Confederated Tribes of the Umatilla Indian Reservation
Hanford Operations Office
750 Swift Boulevard, Suite 12
Richland, Washington 99352

P. Sobotta
Nez Perce Tribe
P. O. Box 365
Lapwai, Idaho 83540

R. Jim, Manager
Environmental Restoration/Waste Management Program Yakama Nation
P. O. Box 151
Toppenish, Washington 98948

U.S. Department of Energy, Richland Operations Office

D. T. Evans	H0-12
R. G. Hastings	L1-02
R. M. Irwin	A6-39
A. P. Larsen (2)	A5-15
D. W. Templeton	H0-12
Public Reading Room	H2-53

DISTRIBUTION

	MSIN
Fluor Hanford	
J. M. Barnett	L1-05
J. A. Bates	N1-25
N. C. Boyter	L5-66
R. C. Brunke	N1-26
S. L. Bump	L1-08
D. B. Cartmell	L5-66
L. P. Diediker	N1-24
R. H. Engelmann	N1-25
T. L. Erickson	L1-08
R. A. Gregonis	L1-08
R. L. Hill	L1-08
M. T. Jansky	N1-25
D. L. Johnson	L1-05
R. E. Johnson (5)	N1-25
J. M. Kisielnicki	L1-02
E. F. Krohn, Jr	L1-02
J. K. Perry	L1-04
D. E. Rasmussen (2)	L1-04
D. J. Riffe	L5-66
L. E. Simmons	L5-66
J. M. Steffen	L5-66
D. S. Takasumi	L1-02
M. S. Wright	L1-08
AOP File	N1-25
Pacific Northwest National Laboratory	
Hanford Technical Library	P8-55
Lockheed Martin Services, Inc.	
Central Files	B1-07
DPC	H6-08
EDMC (2)	H6-08

HANFORD SITE AIR OPERATING PERMIT

Notification of Off-Permit Change

Permit Number: 00-05-006

This notification is provided to Washington State Department of Ecology, Washington State Department of Health, and the U.S. Environmental Protection Agency as notice of an off-permit change described as follows.

This change is allowed pursuant to WAC 173-401-724(1) as: 1. Change is not specifically addressed or prohibited by the permit terms and conditions 2. Change does not weaken the enforceability of the existing permit conditions 3. Change is not a Title I modification or a change subject to the acid rain requirements under Title IV of the FCAA 4. Change meets all applicable requirements and does not violate and existing permit term or condition 5. Change has complied with applicable preconstruction review requirements established pursuant to RCW 70.94.152.

Provide the following information pursuant to WAC-173-401-724(3):

Description of the change:	
A Radioactive Air Emissions Notice of Construction, *Radioactive Air Emissions Notice of Construction for Deactivation Activities at the 324 Building*, Revision 1, is being submitted to the Washington Department of Health (Health) and the U.S. Environmental Protection Agency (EPA) for approval. A change in the Hanford Site Air Operating Permit is required to incorporate this new potential source of air emissions.	
Date of Change:	
Effective date will be the later of the two approvals by Health or EPA.	
Describe the emissions resulting from the change:	
Radioactive air emissions with an annual limit of 7.7 E+2 mrem (unabated) to the Maximally Exposed Individual (MEI) and 3.9 E-1 mrem (abated) to the MEI..	
Describe the new applicable requirements that will apply as a result of the change:	
Applicable requirements will be identified in approval notifications by Health and EPA.	
For Hanford Use Only:	
AOP Change Control Number:	Date Submitted: